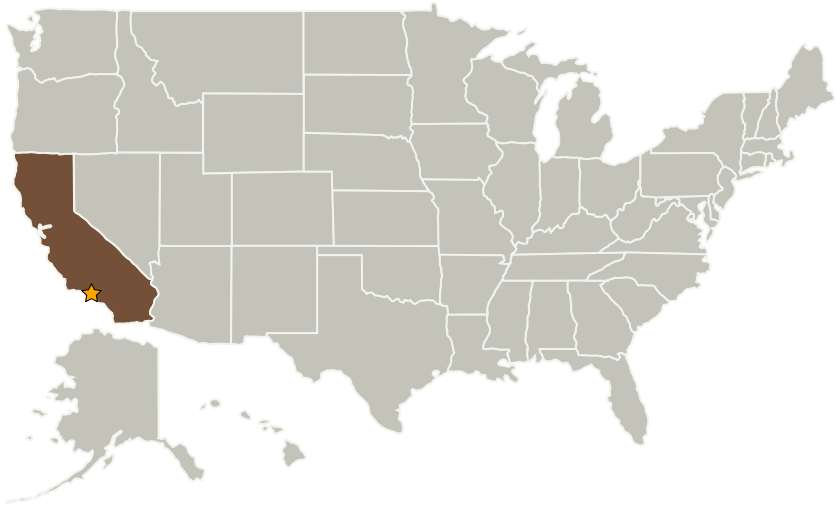
Miniaturized, Low Power Cryogenic Inlet System with Sampling Probes for Titan, Phase I

Completed Technology Project (2006 - 2006)

Project Introduction

Thorleaf Research, Inc. proposes to develop a miniature, low power cryogenic inlet system with sampling probes for Titan. This addresses a key technology gap for planetary studies, mainly how to acquire and prepare complex cryogenic samples of astrobiology interest for in situ analysis while meeting challenging mass, volume and power constraints. Although miniaturized mass spectrometers and other low power instruments are under development by NASA for in situ measurements, the great potential of such instrumentation for exploration of the Solar System will not be realized without complementary developments in the technology for collecting and preparing samples for analysis. Our proposed approach is designed to collect surface samples at Titan's 94K (-179C) cryogenic temperatures using probe designs both for surface penetration and for collecting dust or particles. The samples, which are presumed to include hydrocarbons, nitriles, tholins and other materials, can then be pyrolysed or otherwise thermally processed to prepare them for chemical analysis by GC/MS, GC/IMS or other techniques. The goal of our proposed SBIR Phase I effort is to demonstrate feasibility for a miniature, low power cryogenic inlet system with sampling probes, and to develop a detailed design for fabricating prototype instrumentation in Phase II.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Thorleaf Research, Inc.	Supporting Organization	Industry	Santa Barbara, California

Primary U.S. Work Locations
California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.3 Manipulation
    - TX04.3.4 Sample Acquisition and Handling